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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/754,172 | 01/09/2004 | Stephan Dobritz | 2003 P 50104 US | 8452 |
| 25962 | 7590 | 01/25/2005 | | |
| SLATER & MATSIL, L.L.P. 17950 PRESTON RD, SUITE 1000 DALLAS, TX 75252-5793 | | | | |
| | | | EXAMINER TANG, MINH NHUT | |
| | | | ART UNIT 2829 | PAPER NUMBER |
| DATE MAILED: 01/25/2005 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/754,172

Applicant(s)

DOBRITZ ET AL.

Examiner

Minh N. Tang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-17 and 20 is/are rejected.
- 7) ☒ Claim(s) 3,4,18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the dies (plural) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will

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be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: individually separated dies or dies (i.e., plurality of dies) placed on the support structure.

4. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

5. Claims 1, 3, 6 and 18 are objected to because of the following informalities:

a/ in claim 1, since only a single die is placed on the support structure as described in the specification and drawings, therefore "individually separated dies for the testing and/or burn-in of the same" (lines 1-2), "dies" (line 9), and "can be" (line 10) should be -- individually separated die for testing and/or burn-in --, -- the die --, and -- is --, respectively.

b/ in claim 3, line 3, "bump" should be -- bumps --.

c/ in claim 6, since "the re-distribution layer" refers to "a re-distribution layer" recited in claim 5, therefore claim 6 should depend upon claim 5.

d/ in claim 18, line 3, "the tip" should be -- a tip of the elastomer bumps --.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-2, 5-17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth (U.S.P. 5,982,185) in view of Farnworth et al. (U.S.P. 6,329,829).

As to claim 1, Farnworth discloses, in Figs. 1 and 8, a carrier (10, Fig. 1) for receiving and electrically contacting individually separated die (12) for testing and/or burn-in, wherein the carrier (10) comprises: a support structure (16MB); first contacts (44MB) disposed on the support structure (16MB) and arranged in a grid pattern corresponding to a die (12) to be contacted; bumps (42MB) provided on the first contacts (44MB); second contacts (60MB) formed on the bumps (42MB), wherein the

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second contacts (60MB) are electrically connected to the first contacts (44MB); and at least one opening (48I, Fig. 1) in the support structure (16MB) wherein the die (12) placed on the support structure (16MB) is drawn against the bumps (42MB) by a force generated by a vacuum and applied through the opening (48I). Farnworth does not disclose the bumps are made of elastomer. Farnworth et al. disclose, in Fig. 4A, elastomeric contacts (18) used to establish temporary electrical connections with flat contact locations (24) on a semiconductor component. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the carrier of Farnworth by providing elastomeric material to the bumps as taught by Farnworth et al. so that by using elastomers, the elastomeric contacts are naturally resilient to provide compliancy characteristics and help to prevent excessive contact forces from damaging the contact locations on the component.

As to claims 2 and 17, Farnworth discloses in Fig. 1 and 8, the second contacts (60MB) are comprised of gold.

As to claims 5-6 and 20, Farnworth discloses in Figs. 1 and 8, a gold-gold contact is realized between the die (12) and the carrier (10) by a re-distribution layer (see, for example Fig. 4) arranged on the die (12), and wherein the re-distribution layer comprises a copper-nickel-gold layer construction.

As to claims 7 and 11, Farnworth in view of Farnworth et al. disclose the fixing of the die (12) takes place by a cover (18), wherein the cover (18) compresses the elastomer bumps (42MB) with a predetermined pressing force after placing.

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As to claims 8 and 13, Farnworth discloses in Fig. 1, the cover (18) is formed as a spring element.

As to claims 9 and 15-16, Farnworth discloses, in Figs. 1 and 8, a method of processing a semiconductor die (12), the method comprising: providing a semiconductor die (12), the die (12) including contacts (50) formed in a pattern; providing a carrier (10), the carrier (10) comprising first contacts (44MB) disposed over a surface of a support structure (16MB), bumps (42MB) provided on the first contacts (44MB), and second contacts (60MB) formed on the bumps (42MB), wherein the second contacts (60MB) are arranged in a pattern corresponding to the pattern on the die (12), the second contacts (60MB) being electrically coupled to the first contacts (44MB); placing the die (12) on the support structure (16MB) of the carrier (10); securing the contacts (50) of the die (12) against the bumps (42MB) by a predetermined force generated by a vacuum (see column 3, lines 35-45); and evaluating (i.e., full functionality testing and burn-in testing) the semiconductor die (12). Farnworth does not disclose the bumps are made of elastomer. Farnworth et al. disclose, in Fig. 4A, elastomeric contacts (18) used to establish temporary electrical connections with flat contact locations (24) on a semiconductor component. It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the carrier of Farnworth by providing elastomeric material to the bumps as taught by Farnworth et al. so that by using elastomers, the elastomeric contacts are naturally resilient to provide compliancy characteristics and help to prevent excessive contact forces from damaging the contact locations on the component.

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As to claim 10, Farnworth discloses in Figs. 1 and 8, the die (12) is fixed until the contacts (50) of the die (12) are secured against the elastomer bumps (42MB).

As claim 12, Farnworth discloses in Figs. 1 and 8, the pressing force is approximately 2 to 8 grams per elastomer bump (42MB).

As to claim 14, Farnworth discloses in Figs. 1 and 8, providing a semiconductor die (12) comprises: fabricating a wafer (not shown) that includes a plurality of semiconductor dies (12); and separating the wafer to provide the semiconductor die (12).

Allowable Subject Matter

9. Claims 3-4 and 18-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3-4 and 18-19 recite, inter alia, the electrical connection of the first contacts to the second contacts is established by conductor tracks rising on the elastomer bumps in a spiral or arcuate manner to a tip of the elastomer bumps.

The art of record does not disclose the above limitations, nor would it be obvious to modify the art of record so as to include the above limitations.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

| | | |
|-------|-----------|---|
| Smith | 6,064,217 | Fine Pitch Contact Device Employing A Compliant Conductive Polymer Bump. |
|-------|-----------|---|


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Buchoff et al. 3,971,610 Conductive Elastomeric Contacts And
Connectors.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh N. Tang whose telephone number is (571) 272-1971. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor R. Ramirez can be reached on (571) 272-2034. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


MINH NHUT TANG
PRIMARY EXAMINER
01/19/05